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SCHOOL AND SOCIETY

Volume V SATURDAY, JANUARY 20, 1917 Number 108

TRAINING NORMAL-SCHOOL SENIORS IN EDUCATIONAL MEASUREMENT[1]

THE STATUS OF THE EDUCATIONAL MEASUREMENT MOVEMENT

WE live in an age whose watchword is efficiency. In every field of human activity there is an insistent demand for larger and better results. Particularly has this demand been heeded in industry, in government and in education. The application of scientific principles of organization, of administration and of production has completely revolutionized industry. Never in our history has the demand for efficient government in local communities, in the state or in the nation been so effective. The time existed within the memory of every one here present when in some communities a public official could frankly admit "grafting," or even publicly boast of it, and still be reelected to office. That time has passed. No candidate for public office to-day dares to ask for the votes of his fellow citizens except on his promise of an economic and efficient administration.

This same demand for efficiency has been made of the public schools, particularly during the past eight or ten years. The demand first found expression in the school surveys, which were organized to find out what the schools were doing and how well they were doing it. This school-survey movement for the scientific appraisal of present educational achievements is of such recent origin and we are so much a part of it, that it would be quite impossible to analyze it satisfactorily. However, some phases of the movement are obvious. That the movement is national in scope, that it is to-day gaining the attention of the profession more rapidly than any other educational topic, and that it is changing and is likely to change fundamentally many phases of our educational system there can be no doubt.

The extent of the movement may be partially appreciated from the fact that the United States Bureau of Education reports over 100 surveys which have been carried on within the past ten years. These surveys have covered the whole educational system of some of our largest states; they have been carried on in several of our largest and many of our smaller cities; in some cases they have included every phase of the educational system involved, and in other cases only selected aspects of the system.

Surveys have been carried on in New York City and Boston on the Atlantic seaboard, and in Portland, San Francisco and Los Angeles on the Pacific coast. Chicago, on the northern border, was among the first cities to be investigated by an educational commission; and San Antonio, in Texas, on the southern border, has recently been surveyed. Each year an increasing number of cities is added to the list. To-day more than ever before, cities are carrying on school surveys in order to appraise the work of the public schools as a preliminary step in determining the future development of the educational system.

That the movement for the scientific measurement of educational results is rapidly

[1] Read before the National Council of Teachers of English, Elementary-Normal School Section, December 2, 1916.

coming to occupy a respected place in the center of our educational stage will be evident to any one who examines the evidence. The programs of our many educational meetings bear witness to this fact. Only one illustration can be given, and the program of the meetings of the department of superintendence of the National Education Association will serve the purpose.

At the Philadelphia meeting of the department in 1913, the session which attracted most attention, and the one which caused most discussion, was the occasion of a paper by Professor Strayer on "Tests and Standards of Efficiency in Schools and School Systems" before the National Council of Education. The paper constituted the report of a committee of which Professor Strayer was chairman. The meeting as a whole was by no means certain just where it stood; however, individual members were very decided in their positions for or against the ideas set forth in the paper.

By the time two years had passed, the movement of which Professor Strayer's paper was an interpretation had gained force. Several additional surveys had been completed and others were under way. In addition, departments of educational measurement and research were being established in public school systems, whose sole function it is to measure and interpret educational results. By the end of 1915 such departments existed in New York City, Boston, Rochester, Schenectady, Baltimore, New Orleans, Detroit, Kansas City and Oakland, California.

At the Cincinnati meeting of the department of superintendence in 1915, several programs were organized to afford an opportunity for discussing educational standards, and standard tests and scales. The proponents and the opponents had their inning, and while no final decision was reached the proponents felt satisfied with the result. The Cincinnati meeting also marked the organization of a National Association of Directors of Educational Research, whose membership is made up of those engaged in educational research.

At the Detroit meeting of the department of superintendence in 1916 the number of topics on the whole program on the subject of educational measurement was second only to the subject of rural education, a subject which the United States commissioner of education was especially promoting. The National Association of Directors of Educational Research for the first time offered a program devoted to a description of some of the results already achieved by departments of educational measurement in those cities where they have been established. The attendance at the meeting taxed the capacity of the room. The attitude of the audience had completely changed since the Philadelphia meeting in 1913. The Philadelphia audience challenged the wisdom of attempting to make standard tests and scales, or to set up educational standards, as well as the possibility or wisdom of using them if they were established. The attitude of the audience at the Detroit meeting was that of interested inquiry and earnest desire to be informed. During the three years which had elapsed between the Philadelphia meeting and the Detroit meeting, the situation had so completely changed as to make it possible for Superintendent Chadsey, of Detroit, where a department for educational research in the public-school system has been organized, to predict that within a few years at least fifty cities of the United States would have such departments.

The school-survey movement is changing, and is likely to change fundamentally many phases of our educational system. How well a school or a school system is discharg-

ing its functions must be determined by the extent to which that school or school system is doing what it ought to be doing. The first step is to define what such a school system ought to be doing. One of the most far-reaching results from this movement for greater efficiency in education is the attempt in general to restate the aims of education in a democracy and in particular to define the purposes of teaching the various subjects of study. Among other things, this movement has resulted in a renewed and forceful attack on the fundamental problem of formal discipline, or general versus specific training. It has also forced on the profession consideration of a thoroughgoing reorganization of American secondary education. Further, it has challenged the wisdom of the present organization of American schools according to the 8-4-4 plan for elementary, secondary and collegiate education, and has proposed some fundamental changes through the introduction of the intermediate or junior high school.

WHAT THE SCHOOL-SURVEY MOVEMENT HAS SHOWN

School surveys have revealed to the educational profession the striking lack of any educational standards by which the effectiveness of a school or school system may be judged. Is a large school system to be considered efficient when eleven per cent. of the total teaching time in the high schools of that city is devoted to classes with over forty pupils? In other words, how many pupils should constitute a high-school class? An elementary-school class? How much election of studies should be allowed high-school pupils? What proportion of the time should be devoted to the various subjects in the elementary school? These are but a few of the many questions of fundamental importance in organization and administration which can not at present be answered with any degree of satisfaction because of the absence of any authoritative standards to which appeal can be made. At present these questions are answered largely by personal opinion. Educational investigators who have participated in surveys have been obliged to attempt to answer such questions, but have largely done so provisionally and on a purely theoretical basis. The teaching profession in this country is supported by the annual expenditure of millions of dollars. The absence of reliable standards by which the profession may give an account of its achievements is an indictment the like of which could not be brought against any other like expenditure of public money.

This absence of authoritative educational standards which has been described is to be accounted for in large part by the lack of proper methods of recording our educational experience as a basis for establishing such standards. A detailed study of any one of these administrative questions would undoubtedly reveal a sufficiently clear unanimity of practise as to constitute a practical standard until such time as the matter could be more conclusively determined by experimentation. The common practise, or the present achievements in any subject, should be taken as standards until more authoritative ones can be determined. The facts needed as a basis for establishing such standards can be gathered in any school system, if the educational practise and experience in that system are properly recorded, capitalized and made available. This is one of the important functions of departments of educational research in public-school systems and would justify the existence of such departments, if they undertook no other task.

Heretofore, our professional experience has not been organized and thus made

available for practical use. One school system ignorantly makes the same mistake that another system has learned by experience how to avoid. One school board may learn how to run the school system effectively, and because of lack of recorded experience in the form of studies and reports, its successor may be a dismal failure. One school principal profits by the failures and successes of another principal altogether too much by chance or by mere accident. One of the most striking educational needs of the day is a means of recording and capitalizing for practical use the professional experience of those whose business it is to run the school system. When such a need is met, school policies will be determined on a basis of fact rather than on mere personal opinion or whim.

The school-survey movement and the concomitant movement for the detailed measurement of educational results have also shown the need of standard tests as a means of measuring accurately our present educational achievement in the various subjects. The ability of pupils can be satisfactorily measured only by means of tests, the difficulty of which is known. Even in as definitely defined a subject as spelling, it is not an easy matter to prepare two tests of equal difficulty. Every investigation thus far carried on has shown that the teacher's judgment is not a reliable basis for determining how difficult words are. The degree of difficulty of words must be determined by the ability of pupils to spell them. What is true of spelling tests is true of tests in every other subject of study.

Educational standards are needed not merely for educators who are conducting investigations, but they are needed by every executive and administrative officer in the school system as a means by which he may determine whether his school system is attaining a reasonable degree of success. Such standards not only become a yardstick by which to judge the phases of the system, but they are also the mileposts by which educational progress is measured. If such standards are based on present educational achievement, then by applying those standards from year to year the amount of progress can be shown. An illustration of the method of establishing objective standards on the basis of present educational achievements follows.

Deriving a Standard on the Basis of Present Achievement[2]

During the spring of 1913 a committee of twelve was selected from the teaching and supervising staff of Boston for the purpose of establishing standards in English. During the following school year, the committee issued four reports, all of which established standards in English. One of its most valuable contributions was its bulletin on "Tentative Minimum Requirements in English for Graduation from an Elementary School." These requirements follow.

A graduate of an elementary school should be able to do readily the following things:

1. To copy twelve lines of simple prose or poetry, and a bill of at least seven items. (Copying is not an end in itself, but a means to an end. The pupil should be made to see that accuracy in arithmetic, language and other subjects may depend largely on accuracy in copying.)

2. To take down from dictation a passage of simple prose. (The purpose of dictation is to test language forms, punctuation and spelling already taught. It should never be used as a method of teaching. It should succeed and not precede a teaching lesson.)

3. To write from simple directions a friendly letter or an application for a position. (The letter is to be the pupil's own work, but he may be allowed to make corrections and to rewrite. There should be no corrections by the teacher.)

[2] Bulletin No. VI., Department of Educational Investigation and Measurement, Boston Public Schools.

4. To write within a half hour a simple, original composition of not less than one page of letter paper, with every sentence grammatically complete. The pupil may make revisions, including interlinear corrections, but must not rewrite.

In this composition the total number of serious errors in grammar, spelling and punctuation should not exceed five—such errors, for example, as "I seen," "we was," "had wrote," "he try" for "he tried," "a women," the use of "they" for "there," "there" for "their," "to" for "too"; the misspelling of such common words as "Wednesday," "February," "eighth," "which," "stopped," "nineteen," "minute," "father," "mother," "English"; the omission of the period at the end of a sentence.

5. To recognize the parts of speech in their common uses; to explain the construction of words and phrases in a simple sentence containing not more than one phrase modifier in the subject and one phrase modifier in the predicate; to have a practical understanding of the uses to which the dependent clause of a complex sentence can be put—whether it be to serve as noun, adjective or adverb; to know the principal parts of regular verbs and of the common irregular verbs, and their tense forms through the indicative mood.

6. To read at sight with readiness and good expression simple prose as difficult as "Little Men" or "Hans Brinker."

7. To quote either orally or in writing fifty lines, not necessarily consecutive, of classic prose or poetry. (The pupil should look upon this not merely as something to be expected of him in the high school but also as a part of his equipment for life.)

8. To stand before the class and talk clearly on some subject of personal, school or public interest.

These requirements were not based on any extended experiments, but merely represented the consensus of opinion of the committee. The committee feels that these requirements are reasonable and represent a minimum amount of ability which should be expected of those pupils who satisfactorily complete the elementary-school course. No attempt was made to indicate quantitatively how nearly pupils should be expected to reach these standards.

The Department of Educational Investigation and Measurement has undertaken to put on a fact basis each one of these requirements. To that end, a test in accurate copying was given in November, 1914, to 4,494 first-year pupils in fourteen of the fifteen high schools in Boston.

In giving this test the department was not concerned with the value of accurate copying as an accomplishment. The department was concerned with finding out to what extent elementary-school graduates are able to meet a theoretical standard in accurate copying, defined by the committee on standards in English and officially adopted and put into effect by the board of superintendents.

A selection of sixteen lines was made from Bliss Perry's "A Study of Prose Fiction." The selection was printed on paper 8×10 inches and a copy placed on the desk of each pupil. The instructions at the head of the paper were as follows:

Copy in ink as much of the following selection as you can copy accurately in fifteen minutes without hurrying. Accuracy is more important than speed.

While we may all agree that "A graduate of an elementary school should be able . . . to copy twelve lines of simple prose or poetry," it is important to determine on a fact basis to what extent he can do so. This is the province of educational measurement.

Basing our standard on the median accomplishment, *i. e.*, that minimum achievement attained by 50 per cent. of the pupils tested, the new requirements would read as follows:

A boy graduating from the elementary school should be able to copy fifteen and one half lines (4⅛ inches long or 30 ems of 10-point type) of ordinary prose in fifteen minutes, making not more than five errors of any kind.

A girl graduating from the elementary school should be able to copy sixteen lines of ordinary prose in fifteen minutes, making not more than three errors of any kind.

A mixed class graduating from the elementary

school should be able to copy sixteen lines of prose in fifteen minutes, making not more than four errors of any kind.

It is to be noted: First, that not more than 50 per cent. of the children are able to copy a selection of this kind without making more than four errors; second, that this result establishes the standard on a basis of present achievement and such standards should supplant theoretical ones as fast as standard tests can be given; and, third, that by establishing standards of achievement on the basis of the present accomplishment of pupils, we not only determine present achievement, but also make it possible to measure future progress in the schools by comparing future achievements with the established standards.

HOW INSTRUCT PROFESSION REGARDING EDUCATIONAL MEASUREMENT

Thus far the writer has tried merely to sketch in outline what future educational historians will undoubtedly describe as a great movement for the measurement of educational results. He has tried to show that the movement is national in scope: that it is challenging our aims, our methods and our present organization and administration of education; and that it has already initiated several important changes in our educational system. The movement is in its infancy and its significance is still only vaguely understood by the profession, and not understood at all by the public. To be as effective as it ought to be, the movement must be interpreted to the public generally, and particularly to the teaching profession. It is the purpose of this paper to indicate how Boston is undertaking to train its normal-school seniors in the significance of this national movement for the measurement of educational results.

The success of educational measurement, like any other movement in education, depends primarily on the attitude of the profession toward it. As one views the members of the profession in service, one is struck with the difficulty of making progress with any new idea, particularly one so complicated, so fundamental and so far reaching as the idea embodied in the movement for educational measurement. Educational administrators wage a continuous battle with the public and with the profession for educational reform from year to year and from decade to decade. One might describe this battle as an eternal conflict between what we have and what we want; between what now exists and what we know ought to be. It is a conflict between conservatism undertaking to maintain the status quo on the one hand, and progressiveness undertaking to introduce improvements on the other. While the forces of conservatism are dominant in many school systems, nevertheless, there is reason to believe that at no time in our educational history have the progressive forces been more powerful, or been more successful in bringing into educational practise promising reforms than during the past ten years.

The explanation for the slow progress that such a movement as educational measurement makes is not difficult to understand. The great majority of superintendents, principals and teachers now in the educational service were trained for their professional work, ten, fifteen or twenty-five, or even thirty years ago at a time when no one had heard of a standard test or a scale for measuring educational results. The absence of any thoroughly effective plan to insure the after-training of teachers in our school systems does not improve the situation.

As far as educational measurement is concerned, the superintendents, principals and teachers in the service can be classified into three rather distinct groups.

A. Those who are opposed to it on general principles. They would be opposed to anything which threatens to disturb the even tenor of their ways.

B. Those who are indifferent to it. Either from choice or from ignorance, they are educational neutrals. They are neither for nor against it.

C. Those who are in favor of it. They are supporters of any movement which promises to make their work more effective.

With those who are opposed to it the leaders of the scientific movement are likely to have some quarrels. Among those who are neutral they should try to make converts. With the last group they merely need to provide opportunity. Among this group are the teachers who attend our summer sessions in colleges, who sacrifice time to take extension courses, and who take advantage of every other opportunity to keep themselves abreast of the best educational thought.

While, undoubtedly, much can be done to educate those already in the service in the significance of educational measurement, nevertheless, the success of the scientific movement depends more largely on the character of the training which is given those in our colleges and normal schools who are undertaking to learn to teach.

Only a small portion of those in the service can be counted on to make the necessary effort to educate themselves in the movement. But with those who are now being trained for the teaching profession it is different: they can be given instruction. If they do go out from our colleges and normal schools untrained in the significance and meaning of this great educational movement, then the possible results from the movement are to be indefinitely postponed, if not lost altogether. If they are properly trained in the appreciation of the movement, in its origin, its history, its methods and its attained results, then they are in a position to carry into the schools where they may be appointed a valuable asset over and above that possessed by their predecessors. At best it will take a complete generation to train our profession in this movement. Because it will take so long under the most favorable circumstances, it behooves our normal schools to make the best use of the opportunity to offer proper instruction to candidates for the teaching profession. In the following pages I shall describe how one city is undertaking to give such instruction.

THE BOSTON PLAN OF TRAINING NORMAL-SCHOOL SENIORS

The Boston Normal School is the city training school for teachers. It offers a three-year course and enrolls annually one hundred new students selected from among the graduates of the high schools of Boston on a competitive basis. The character of the work in the normal school will be indicated by the fact that a large proportion of the subjects offered have been approved for credit toward the degree of Associate in Arts given those who complete the required courses approved by the Board of University Extension. On the completion of the three-year course the graduates are placed on a merit list according to their records in the normal school.

During one half of the third year the seniors devote their time to observation and practise work in the public schools. While the seniors are thus engaged, they are under the direction of the department of practise and training of the superintendent's office. Their whole time is devoted to this work. At stated times they meet for instruction carried on by the director of practise and training, who was formerly a member of the faculty of the normal school and who is now, as assistant superintendent, closely associated with that institution.

To carry on this observation and practise work, the senior class is divided into two groups at the beginning of the year; one group, consisting of those seniors who have thus far stood highest in their professional work, is assigned for observation and practise work during the first half-year. The other two thirds continue their professional work in the normal school. At the mid-year these two groups exchange places, those who did their observation and practise during the first half-year report to the normal school, and those who were in the normal school report to the department of practise and training for their observation and practise work.

By arrangement with the department of practise and training, and the normal school, the department of educational investigation and measurement assumes entire charge of each one of the above groups for one month in each half-year. That third of the seniors who do their observation and practise work during the first half-year, report to the department for the month of December or about fifteen school days. These seniors are responsible for no other work except that assigned to them by the department. They receive no other instruction except that given them under direction of the department. Attendance is taken regularly and each pupil is given a rating for the character of work done. This rating counts as a part of the record which determines the standing of each candidate on the merit list. During the month of May the department directs the work of the other two thirds of the senior class in a corresponding manner.

The instruction given by the department consists of lectures, discussions, training in giving standard tests, and in the correction of the results. In the lectures, these prospective teachers are instructed in the origin, development, limitations and possibilities of the movement for the scientific measurement of educational results.

These seniors are also trained as examiners to give in the various schools of the city those tests which the department desires to give. The department has arranged its testing work so that the smaller group of seniors can be satisfactorily handled in December and the larger group in May. In December the work is largely experimental; *i. e.*, the trying out and standardizing of tests. The May testing period is devoted to the measurement of educational results through the application of tests which have already been standardized.

In addition to this, the seniors are also given a limited amount of instruction in the correction of the results of the tests and in the statistical tabulations. This particular phase of the work is primarily to give prospective teachers an idea of the great care exercised in the correction of the results, and also to emphasize the difference between the ordinary tests or examinations and standard tests. The seniors are asked to do only a limited amount of this work, because the statistical work of the department is ordinarily done either by its own clerks or by girls from the Boston Clerical School. Seniors are not kept at this work beyond the time when they are learning something which it will be of advantage to them to know when they become teachers.

While the department must have trained examiners to give the Courtis tests during the month of May each year, the employment of seniors in the normal school for this purpose is only secondarily for the purpose of getting that work done. The primary purpose of this arrangement is to train the seniors in the meaning and significance of educational measurement. Educational magazines are publishing an increasing amount of educational literature containing statistical terms, graphs and

statistical facts, used in the discussion of professional subjects. Annual reports of superintendents are carrying large quantities of matter covering attempts to measure educational results, and those results are always worked out by statistical methods, and stated in statistical terms. If the educational profession is to be properly trained, if it is to keep abreast of this movement, then its members must be able to understand statistical terms and methods, and to interpret school reports and the professional literature of the day.

Boston's plan for accomplishing this purpose is offered as a suggestive workable plan. While in some of its details it would not be directly applicable to the situation in other cities, nevertheless, it seems to those who have worked it out to be fundamentally correct. Among the results secured from the administration of the plan, from the standpoint of the prospective teacher, are the following:

1. The seniors are instructed in the significance of the movement for the measurement of educational results in general, and of the purposes and accomplishments of the department of educational investigation and measurement in Boston in particular.

2. They are made acquainted with the standard tests, the methods of giving them, and the results which are secured from giving them. They acquire this knowledge not from a mere discussion of the tests or from talk about them, but by actually giving them and correcting some of the results.

3. They are given enough instruction in statistical methods so that they can interpret the significance of educational literature in general and school reports in particular. Hereafter every teacher appointed from the normal-school list will carry into the schools the knowledge necessary to profit intelligently by the reports on results achieved from giving standard tests.

4. When these seniors have become teachers in the schools they will be able to understand the significance of such standard tests as the department of educational investigation and measurement gives in the schools. Furthermore, having given the tests themselves, they will also know whether the special examiners sent to give tests are giving them properly.

5. By such a system of training carried on over a period of years, the teaching force in any school system will ultimately be able to give most, if not all, standard tests, so that special examiners will be unnecessary.

The situation with regard to the training of normal-school seniors in the significance of educational measurement seems to be particularly clear. The measurement of educational results is a great national movement which is likely to affect fundamentally our whole system of education. The profession is thoroughly interested in the movement. There are those who see in it only the gravest dangers, while others see in it greater possibilities than have appeared in any educational movement for at least a half century. Whether the movement is a mere passing "fad," or something that has come to stay, it would be futile to argue at this time. Whatever the outcome of the movement may be, the profession must be enlightened concerning it. In ignorance alone there is danger. In an intelligent understanding of it there is hope. Whether future developments prove that the movement is fraught with serious dangers, or that it is the introduction to a great educational renaissance, it is important that the prospective as well as the present members of the profession should be intelligently informed concerning it. The Boston plan for the training of prospective teachers in educational measure-

ment indicates how one city is undertaking to solve this important educational problem.

FRANK W. BALLOU

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EDUCATIONAL EVENTS

A MILL TAX FOR THE UNIVERSITY OF WASHINGTON

A MILL tax of $.009, yielding $1,777,210, is asked of the next legislature for the maintenance and building fund of the University of Washington, by the regents of the university in their fourteenth biennial report to the governor of the state. The regents also seek favorable action by the legislature on sixteen definite educational recommendations listed in the report.

The report further recommends the renewal of appropriations to the building fund of the university from tuition and matriculation fees, rentals, endowments and earnings of university property and land, totaling in all $262,000.

In addition to this amount the legislature will be asked to include in the building fund, the land endowment income for the biennium which constitutes the State University Current Fund. This amount will approximate $60,000. The regents also ask 5 per cent. of the mill tax, a sum approximating $103,000, for building purposes. These two additions to the building fund will give immediate relief.

The recommendations of the regents are summarized as follows:

That a college of commerce be established and that the necessary supporting subjects of instruction be established.

That the existing medical preparatory course be made efficient.

That instruction in fisheries be inaugurated.

That provision be made for practise and observation facilities in connection with the college of education.

That marine and aeronautical engineering and graduate instruction in engineering be devolved.

That forestry instruction be strengthened by the addition of a department in milling and marketing, and that the negotiations with reference to the establishment of a demonstration forest be carried out.

That additional library equipment be provided for the school of law.

That ceramic expert and assistant be added to the staff of the college of mines for the study of clay resources of the state, and for instruction in the mining and manufacture of the products for which Washington's resources are best adapted.

That provision be made for the extension of the summer session from six weeks to twelve weeks.

That the work of the extension division should be supported, that its direct, cooperative services along many lines may be brought to the assistance of larger numbers of the people of the state.

That the bureau of industrial research be supported for the investigation of problems of statewide significance.

That the college of mines be enabled to cooperate with the United States bureau of mines in the investigation of problems connected with the mining industry of the northwest.

That the graduate school should be encouraged by a reasonable allowance for more adequate facilities for research.

That a forest products laboratory be established, equipped and maintained.

That the Puget Sound marine station should be developed that its work may be more fruitful, both in the field of pure science and in lines of investigation bearing on the industrial development of the fisheries of the state.

That means for the continuation of building development should be provided, so that within a reasonable time adequate accommodations can be had.

MINIMUM SCHOOL TERMS

FORTY-FOUR states have established by law a minimum term of from 60 to 180 days of school for each organized district, according to a bulletin from the Bureau of Education. J. C. Muerman, who compiled the bulletin, points out that four states, Louisiana, Alabama, Rhode Island and Georgia, have no minimum requirement laws, but that one of these, Rhode Island, has for over ten years maintained the longest average term in the United States. While the minimum number of days required is almost invariably much less than the actual average number of days in the school term for the state, a majority of the states still report many schools unable to meet even the low minimum requirements. Within the past three

years, 12 states—Arizona, Colorado, Idaho, Kansas, Maine, Nebraska, Nevada, New York, North Carolina, North Dakota, Vermont and Wyoming—have added from ten to sixty days to the legal requirement of a minimum school term.

Some of the factors that have operated in favor of a longer school term, aside from the general awakening of public sentiment, are the phenomenal growth of the public high schools, the development of state financial aid for weak districts, equalization funds, and penalties for not maintaining a minimum term required by law.

The growth of the public high schools has tended to lengthen the term in the elementary schools by setting up standards of admission by certificate or examination which can ordinarily be met by grade schools with a term of at least eight months.

"Lack of provision for adequate funds is perhaps the greatest hindrance to a longer school term," declares Mr. Muerman. "A majority of the states have fully realized the necessity for more state financial assistance and have enacted laws giving state aid to weak districts to enable them to maintain a minimum school term. A wise provision in most of these laws makes the levy of a specified minimum rate of local taxation necessary and provides for a certain specified standard of school before aid becomes available. These laws are, as a rule, intended to help only those who first help themselves. The necessity of greater local cooperation and aid is urged in the 1912 report of the state superintendent of public instruction for Georgia. This report calls attention to a tendency to lean too heavily upon state aid, and cites the laws of another state which require a county levy of not less than three and not more than seven mills before state aid can be secured."

In answer to an inquiry from the commissioner of education, over one half of all the state superintendents have expressed a willingness to cooperate in securing a uniform 160 days' term for all schools, including rural schools. This would represent considerable improvement over the present average of 137.7 days.

THE HUGHES BILL FOR VOCATIONAL EDUCATION

CONGRESSIONAL approval of federal cooperation in vocational education, advocated by labor leaders and educators and recommended by President Wilson in his address at the opening of the present session, was given on January 9, when the House passed the Hughes bill, similar to a measure passed by the Senate at the last session, making appropriations for training and employment of teachers in state schools to help prepare boys and girls for useful employment.

Some differences between the Senate and House measures remain to be adjusted in conference, but, according to the news dispatches from Washington, congressional leaders believe they can be disposed of so that the first appropriations will be available on July 1, next, the effective date stipulated in the House bill. The amount appropriated for the first years is $1,700,000 and a greater fund is authorized for each succeeding year until an annual total of $7,200,000 is reached nine years hence.

Administration of the system would be under a board created by the bill, and in order to participate in the distribution each state must appropriate an amount equal to the federal allotment to it, and must create a state board to cooperate with the federal officials in coordinating the work. No teacher employed under the act would be placed in any school not under public control or which does not provide classes both day and evening. The instruction offered would be only for persons more than fourteen years old.

Of the original appropriation $500,000 would be used for salaries for teachers of agricultural trades, distributed to the states according to their rural population; $500,000 for the salaries of teachers of industrial trades, distributed according to urban population; $500,000 for training teachers of these two classes and $200,000 to pay the salaries and expenses of the administering board.

The teachers' salary appropriation would be increased $250,000 annually for each class until 1924–25; the annual fund would be $3,000,000 for employment of agricultural and a

like amount for industrial instructors. The fund for training teachers would reach its maximum of $1,000,000 in 1919–20 and the $200,000 annual appropriation for the governing board would remain stationary.

The only important difference between the House and Senate bills relates to composition of the federal board to administer the system. The Senate measure proposes a board of cabinet officers with an advisory board of specialists.

The House bill provides for administration by the commissioner of education and four associates appointed by the President and paid $5,000 each annually.

THE MEMBERSHIP OF THE NEW YORK CITY BOARD OF EDUCATION

When Mayor Mitchel addressed the twelve newly appointed or reappointed commissioners of education, at the City Hall, he made public the fact that he had asked every one of them whether the appointee favored military training of school children and had received an affirmative answer before the appointment was made. The mayor also ascertained that the new appointees favored the duplicate school system, a modification of the Gary plan, before the appointments were made. *School* thus comments on the action of Mayor Mitchel:

> Why did Mayor Mitchel refuse to reappoint Frank D. Wilsey, Rupert B. Thomas, Morton Stein, Dr. Dennis J. McDonald and Thomas M. De Laney members of the board of education and appoint as their successors men, except Mr. J. H. Post, who have had no experience in public-school work? Were there any charges of inefficiency against them? Was there a public meeting held to air any criticism on them? Mr. Wilsey's reappointment was demanded by the people of The Bronx, irrespective of party, in petitions to the mayor and by action of public bodies. Mr. Thomas was also supported by the citizens of Queens, and the other retired commissioners were also recommended for reappointment by their constituents. The wishes of the democracy have apparently no weight with this city administration and its advisory oligarchy.
>
> What were the specific reasons for the mayor's unwillingness to reappoint these commissioners, and especially Mr. Wilsey, Mr. Thomas and Mr. Stein, who were acknowledged and respected leaders? Mr. Wilsey, as chairman of the committee on buildings, was promoting the construction and reconstruction of school buildings on the duplicate school plan as rapidly as possible in accordance with the policy of the board of education and the city administration; Mr. Thomas last year, as chairman of the committee on sites, worked in support of this policy, and Mr. Stein, as chairman of the committee on by-laws, helped frame the proper laws to safeguard that policy. The explanation is that these men respect themselves and their manhood. They will not pledge themselves to any mayor to deliver their votes at his bidding. Last year Mr. Mitchel did pledge new commissioners to vote for Mr. Willcox and admitted it in an interview.

EDUCATIONAL NOTES AND NEWS

Dr. William Wistar Comfort, head of the department of Romance languages at Cornell University, has been unanimously elected by the board of managers president of Haverford College. He will succeed Dr. Isaac H. Sharpless who retires next spring. Dr. Comfort is a graduate of Haverford and Harvard, and also studied abroad for several years.

It is announced that the Rev. Dr. William Pierson Merrill, pastor of Brick Presbyterian Church, has been offered the presidency of Union Theological Seminary and is expected to accept the position.

Dr. Edward Dwight Eaton, of Beloit College, has presented his resignation as president to the trustees. Dr. Eaton has served the college as president for thirty years.

The Order of Chevalier of the Crown of Italy awarded by King Victor Emanuel three years ago was formally conferred upon Dr. John H. Finley at a reception tendered to him by the Dante Alighieri Society and the Italian Teachers Association in the General Webb Room of the College of the City of New York on Tuesday evening, January 9. The speakers were Commander Joseph N. Francolini, president of the Dante Alighieri Society; A. Arbib-Costa, president of the Italian Teachers Association, and member of the department of Romance languages of the

college; Professor Antonio Calitri, Professor Charles A. Downer, and Mr. Lee Kohns, trustee of the college. The decoration of the Crown of Italy was awarded by Francesco Fransori, vice-consul of Italy. In his response, Dr. Finley spoke on Americanization. He urged that attention be given to the contribution to American life made by foreigners.

IN honor of President Harry Pratt Judson and in recognition of his successful development of plans for medical work at the University of Chicago, members of the faculties of the university gave a dinner in Ida Noyes Hall on the evening of December 19. About two hundred and fifty guests were present. Professor Andrew C. McLaughlin, head of the department of history, acted as toastmaster, and the following addresses were given: "Medicine and Man," by Professor James H. Tufts, head of the department of philosophy; "Medicine and the City of Chicago," by Dr. Frank Billings, of Rush Medical College and the University of Chicago; and "Medicine and University Ideals," by Dean James R. Angell. Following the addresses an illuminated memorial, signed by members of the faculties and expressing their appreciation of the president's achievement, was presented to President Judson by Professor Robert R. Bensley, of the department of anatomy. An appreciative response was made by the president.

WILLIAM M. SIMMONS, for thirty years a teacher and principal in the schools of New York City, was tendered a banquet on January 2 by the men teachers of Public School 31, Brooklyn, in honor of his tenth anniversary as principal.

THE State Board of Education has appointed Frank W. Wright, superintendent of schools at Uniontown, Pa., deputy commissioner of education in Boston to succeed Mr. Orr.

PROFESSOR WILLIAM ROSCOE THAYER, of Harvard University, has been elected president of the American Historical Association.

PROFESSOR ALLYN A. YOUNG, of the department of economics of Cornell University, has been elected president of the American Statistical Association.

RAOUL BLANCHARD, Litt.D., professor of geography and director of the Institute of Geography at the University of Grenoble, has been appointed exchange professor at Harvard University for 1916–17. Professor Blanchard's term of service will fall in the second half-year.

THE resignation of Dr. Barrett Wendell as professor of English has been received and accepted by the president and fellows of Harvard College. Mr. Wendell is made professor of English, emeritus. He has been engaged in teaching at Harvard since 1880, first as instructor in English, later assistant professor, and since 1898 professor of English. He graduated from Harvard in 1877. The year 1904–1905 he spent as lecturer to the Sorbonne and other French universities.

DR. J. LAURENCE LAUGHLIN, of the University of Chicago, is giving this week three lectures at Cornell University on "Financial Problems resulting from the Present War." Dr. F. W. Taussig, of Harvard University, will give three lectures in March on "Government Control of Wages."

THE names of fourteen alumni of the University of Pennsylvania have been submitted to the trustees (three to be voted for) as candidates for the two vacancies on the university board of trustees caused by the deaths of Dr. J. William White and former Governor Samuel W. Pennypacker. The fourteen names submitted to the board of trustees are: Albert Ridgley Brunker, Chicago; Alexis Felix du Pont, Wilmington; James Sommers Smith, Philadelphia; Hugh Walker Ogden, Boston; J. Franklin McFadden, Sydney Thayer, Francis S. McIlhenny, Thomas S. Gates and Owen J. Roberts, of Philadelphia; William Lawrence Saunders, of New York; Lindley M. Garrison, former Secretary of War, New Jersey; Judge John Marshall Gest, Frank P. Prichard and Dr. J. Norman Henry, Philadelphia. The election, to be conducted by alumni of the university scattered all over the world, will be the first to be held under the new system adopted last spring by the university trustees.

FRANCIS H. BALDWIN, a merchant of Cincinnati, has left the major part of his estate to the city for the unspecified uses of its university. The bequest is approximately $675,000. The suggestion has been made that the bequest be converted into an endowment fund, the proceeds to be applied each year to the point of greatest need. It is likely that the next new building, possibly an assembly hall, will bear the name of the donor.

THE Billings family, of Chicago, headed by Mr. C. K. G. Billings, has given one million dollars to the University of Chicago toward the endowment of the medical school. To complete the endowment there now remains but $550,000 to be collected. The gift of Mr. Billings is to provide a hospital in connection with the school.

JACOB H. SCHIFF has given $50,000 to New York University toward a $300,000 endowment fund for the division of public affairs in the school of commerce, accounts and finance.

CHANCELLOR JAMES R. DAY, of Syracuse University, has announced the gift of $500,000 to the endowment fund of Syracuse University directed in a letter left by the late John D. Archbold, of the Standard Oil Company, and president of the board of trustees of the university. In his life time, Mr. Archbold had given the university nearly $6,000,000.

A PERMANENT endowment of $10,000,000 for Harvard University is planned by a committee of the alumni headed by Thomas W. Lamont, of New York, "to meet the pressing needs of the university in the form of inadequate salaries and lack of funds for the maintenance of large and costly equipment, and, at the same time, to provide an income sufficient to maintain unquestionably for many years Harvard's position as an institution of higher learning." No time limit for the gathering of the fund has been set, but it is hoped that a considerable part of it will be in hand before the next commencement. Each of the 40,000 living Harvard men is requested to assist in the present movement.

AT the meeting of the trustees of Princeton University on January 11, there was planned a campaign to raise an additional $3,000,000 for the endowment fund for professors' salaries and the purchase of books for the university library. At the present time the funds for professors' salaries yield an income of only $107,000 a year, and the growth of the university has necessitated an annual outlay of $428,000 for salaries. Only one half of this discrepancy has been furnished by the tuition fees of students and a yearly deficit of more than $100,000 has had to be covered by individual subscription. It is estimated by President Hibben that $2,500,000 is needed for further endowment and $500,000 for the university library. An increase in the salaries of members of the faculty to meet the high cost of living was also suggested. President Hibben also advocated the establishment of competitive regional scholarships in order to make Princeton more of a national institution.

MR. AUGUSTUS SHEPARD CHURCHILL, of London, who died on October 18, bequeathed his estate, valued at £100,000, to Harrow School, £50,000 for two scholarships, one on the classical and one on the modern side, of the clear yearly value of £150 each, to be known as the "Shepard Churchill" scholarships, tenable at any college at Oxford for four years. In the election regard is to be had to literary and scholastic attainments, fondness and success in manly outdoor sports such as cricket and football, qualities of manliness, courage, truthfulness, devotion to duty, sympathy with and readiness to protect the weak, kindness, unselfishness and love of comrades; exhibition during school days of force of character and of instincts leading to the exercise of good and kindly influence over schoolfellows. There are also to be founded four entrance scholarships of £120 each for two modern and two classical students. The residue of the property is also left for the benefit of Harrow School in such manner as the governors, with the approval of the headmaster, shall direct.

THE budget of the school committee of Medford, Mass., amounts to $230,000, the largest in the city's history and an increase of $24,000 from last year. This budget contemplates about $20,000 for increases in salaries for the

teachers and $10,000 for repairs on school houses.

PROPOSALS to establish a course in Chicago high schools in military work for girls, teaching them to act as Red Cross nurses and first-aid workers, was considered by the Board of Education at a recent meeting as an adjunct to the plans for military training for school boys, now under way. Captain Edgar Z. Steever, U. S. A., who is supervising the boys' training, said: "If the school board is willing, we shall probably have such a course. All this work will be done by the women teachers."

ACCORDING to the New York *Evening Sun* organized opposition to the introduction of military training at the Eastern District High School, in Brooklyn, has developed and promises to inject a new and serious problem into the carrying out of the provisions of the law providing for it. Out of 1,500 boys in the school only sixty-five volunteered to take the training, and only twenty-five of these were able to obtain the written consent of their parents. Many of them refused because they are under sixteen years of age and exempt, and many others because they had to work after school hours. According to Dr. John H. Finley, head of the State Department of Education, only one isolated case of this sort has appeared since September of last year, when the law became effective. That occurred in the New Rochelle High School, where a student, the son of a socialist leader, refused to take the training. In his case the ruling of the state department was that he must take the training if he wished to stay at the school. The revolt, however, at the Eastern District High School is of a more serious nature, as a league has been formed among the students to make it effective, and to enforce the law may have the effect of nearly emptying the school. The efforts of the principal and the physical director of the school have proved unavailing to explain the nature of the law as purely aimed at physical as distinguished from military training.

PROFESSOR ALBERT BUSHNELL HART, of Harvard University, has been selected chairman of the committee in charge of the educational features of the Congress of Constructive Patriotism to be held in Washington from January 25 to 27, under the auspices of the National Security League and in the interests of better military, naval and industrial preparedness for the United States. S. Stanwood Menken, chairman of the committee on congress of the league, in making the announcement to-day, said that fourteen governors, nearly fifty colleges and universities, and approximately 150 commercial, agricultural, patriotic and defense societies, have agreed to send representatives to the congress and that there will be more than one thousand delegates there. "The object," he said, "is to establish, through the league's efforts, a great national lecture system under the direction of experts who will take up the presentation of national topics in a non-partisan and non-political way in full sympathy with the spirit of our institutions and complete understanding of the industrial and agricultural viewpoint of all sections of the country." Senator Borah, of Idaho, will deliver the main address on the educational feature.

ACCORDING to the report of Mr. William L. Bodine, of the Compulsory Education Department of Chicago, the high cost of living is causing children in increasing numbers to leave the Chicago schools to seek employment. In the period between May 1, 1916, and December 31, 1916, work permits were issued to 7,320 children between the ages of fourteen and sixteen, 4,617 being for boys and 2,703 for girls. The majority received $5 a week or less for the work they engaged in, the report said. Many of these children are from homes where the income ordinarily makes it unnecessary for the children to work.

THE board of education of the District of Columbia has promulgated rules requiring teachers in the public schools to undergo medical examinations to determine their physical fitness whenever the supervising officer immediately responsible for their work so directs. The rules are intended primarily to provide against the continuance in school of teachers suspected of suffering from communicable diseases or of harboring infection endangering the health of their pupils.

PNEUMONIA and grip have so depleted the teaching force of the Philadelphia public schools that the entire substitute list has been exhausted and thirty-eight classes are without teachers.

THE *Boston Evening Transcript* remarks editorially: "The total effect of the speech which Dr. Payson Smith, the new state commissioner of education, delivered last week to the Essex County Teachers' Association as his first important public utterance since taking office, will tend to the establishment of confidence that the direction of Massachusetts' educational policy has been entrusted to safe hands. What the commissioner had to say betokened a man well abreast of the times, but not one attempting to rise on the wave of any newly-made fad in popular education. Conscious though he seemed to be of the demands pressing on the schools to-day, he appeared not to lose sight of the fact that the great goal of education remains fixed through the centuries —the development of the individual to the full of his capacities for living an effective human life. The aim of the grade schools must not be to prepare for the high schools; the aim of the high schools must not be merely to prepare for the college. They must each set first among their purposes the education of the child within the widest scope of his mind and nature directly at the time when they have them to deal with, and not work under the delusion that some higher educational institution will be able miraculously to develop into a man the fledgling whom they have not fledged."

DISCUSSION AND CORRESPONDENCE

INDUSTRIAL PREPAREDNESS—AMERICA AND ENGLAND

THE movement for industrial preparedness in the United States, as planned by the Committee of the Naval Consulting Board, has attracted much attention in England, where a similar movement is in progress.

The American example is cited in England by reason of its democratic method. The purpose was brought directly before the people by an open letter from President Wilson, introducing a series of articles, officially inspired, which outlined the plan of action. The series began with a graphic survey by Secretary Lane of our crude resources and the means of their exploitation. Following at short intervals came expert analyses of the industrial forces to be mobilized for the national welfare. These popular articles, which should be in the hands of every student, are the advance posters of a campaign now in progress in scientific and industrial centers.

The corresponding effort in Great Britain is part of the larger movement which was begun last March by the creation of a reconstruction committee under the immediate direction of Premier Asquith. This committee was intended as a board of review and final decision in respect to proposals from various subcommittees and auxiliary bodies working on the details of a reconstruction policy. In the changed government the premier's committee is superseded for the time by the war council, but this has not interfered with the special committees. Three of this group—the science committee, committee on modern languages, committee on juvenile education—pertain directly to problems brought to the front by the war. Related to this group was the committee on commercial and industrial policy. Of the auxiliary bodies the most important was the advisory council on industrial and scientific research announced directly after the formation of the Asquith committee by the minister of education, or more exactly, president of the board of education.

The committee plan illustrates one distinction between American and English procedure. Public opinion works more slowly in the latter country, but there is also a quicker response to government leadership. In general it is the leadership of local governments, municipal or county, but the stress of war has given supremacy to the central authority, a vantage point which Asquith seized and which assures unwonted strength to Lloyd George. If this change related to war matters only, it would be less significant, but it was strikingly shown in the support given to the reconstruction plan.

Following national precedents in such matters, the English committees comprise men of

eminence in the several specialties; whereas in America there is always danger that such honors may fall to the noisiest men. It was perhaps to avoid such chance that the official announcements of the preparedness movement, this side the Atlantic, were brought out in the *Scientific American*, the journal which appeals directly to the men best fitted by knowledge and experience for an enterprise quite beyond the talents of politicians.

Absorption in war measures has eclipsed for a moment the full significance of the reconstruction movement in England. In its emphasis upon education it carries, however, a lesson equally pertinent in times of war or of peace. This lesson is reiterated in the final expansion of the committee on scientific and industrial research into a department bearing the same title and comprising in its scope Great Britain and Ireland.

As announced December first, the new department would be under the lord president of the council, with the president of the board of education as vice president. Whatever changes have since taken place, the purpose remains of developing and assisting all researches and activities bearing upon the nation's industries, "actual or potential." Thus with a clear vision of the essential factors in the problem—education, science and industry—the English government has taken a broad stride where we are treading cautiously and with apparent oblivion of the educational factor.

ANNA TOLMAN SMITH
BUREAU OF EDUCATION

CONFERENCE ROOM ON CHARACTER EDUCATION

TO THE EDITOR OF SCHOOL AND SOCIETY: The National Institution for Moral Instruction, following its policy of consultation with professional educators, will keep open a conference room on moral or character education, at the Hotel Baltimore, Kansas City meeting of the Department of Superintendents. There will be an exhibit of books and pamphlets, and all who wish to consult together on this phase of education are invited to make appointments to meet in this "Conference Room." Contributions to the exhibit are invited.

The executive committee of the institution will report on the National $5,000 Morality Codes Competition, and announce the judges of the 70 children's morality codes which are being written as interpretations of intelligent public opinion as to the moral ideas to be inculcated in the minds of the nation's children. An announcement will also be made of plans for work during the coming year on methods of character education, by which the morality which is the foundation of the nation's civilization can be successfully inculcated and growth in character produced by the formation of moral resolves and the acquiring of right habits. This announcement can be expected to be of special interest to state superintendents, and consultation with them is very much desired.

MILTON FAIRCHILD
NATIONAL INSTITUTION FOR MORAL INSTRUCTION

THE ELEMENTARY SCHOOL OF THE UNIVERSITY OF MISSOURI

TO THE EDITOR OF SCHOOL AND SOCIETY: The department of superintendence of the National Education Association meets in Kansas City the week of February 26 to March 3. A number of people have made inquiry of me as to whether they might visit the elementary school here at this university before or after attendance upon the National Education Association meetings. Visitors are indeed always welcome at this school and we have a great many of them. For the sake of accommodating visitors who might find it convenient to be here the Saturday preceding the meeting or the Saturday following, we have arranged to hold school on Saturday, February 24, and Saturday, March 3, as well as during the week. This may give information to some who would be glad to come here and spend a day or two at the school.

J. L. MERIAM
UNIVERSITY OF MISSOURI

QUOTATIONS

EDUCATIONAL CONFUSION AND THE REMEDY

THE Massachusetts Normal Art School was, on January 5, the scene of one of a series of conferences being held throughout the state

by members of school committees and superintendents, in an effort to achieve some sort of careful and efficient administration of the public schools. For, strange as it may sound to many, there is a condition of confusion between the functions of the school superintendent and the school committee. No definite ruling as to the respective duties of these officers has been worked out, and it is for the purpose of establishing uniform practise throughout the commonwealth that the general education service of the state board of education is holding these conferences, eleven in all.

The cause of the confusion existing to-day may be seen in the development of the office of school superintendent. Years ago the affairs of a town's schools were administered by a school committee, the members of which acted largely as individuals, each assuming charge of a district. The result of this method was that the children of no two districts ever had the same advantages, the quality of the schools always depending upon the committee member's intelligence and interest. As the inefficiency of this system became apparent, individual towns hired men who acted as a coordinating head and centralized the work of conducting the schools. The opportunities made possible by the new superintendents impressed the legislature so favorably that each town was required to employ a superintendent.

Then the troubles of the school administrators began in earnest. Many towns complied only with the letter of the law, feeling that "a superintendent was all right if he only let the schools alone." No one had a clear idea as to what the relations between the superintendent and the school committee should be, or what were the respective duties of each. The problem of reconciling the office of the superintendent with the committee became a large and difficult one, and the conferences this year, as well as a series held last year, are efforts toward the solution of it.

The spirit of those present at the conference seemed to favor the superintendent being considered as the executive officer and the committee the legislative body. Nevertheless, whatever the conferences may themselves think or decide, the fact remains that the relationship between superintendent and committee is not clearly defined. As was said by Deputy Commissioner of Education Robert O. Small, the board of education is an executive body and not legislative, and it devolves upon the legislature to establish the absolute duties and settlement of relations of superintendents. The increasing cost and enlarging scope of public education make a more efficient administration of the public schools imperative, and this can not be accomplished when wide differences of opinion exist as to just who is the administrator. The legislature should promptly and clearly define the status of all officers connected with the schools. It should not leave this matter as legislatures so often leave others, to be settled by some one else. Legislatures have a habit of passing measures and then letting some one else get out of the ensuing difficulty.

The general education service has issued a pamphlet with the purpose of presenting approved procedure in school administration, establishing uniform practises throughout the commonwealth, and defining the individual and joint activities, duties, responsibilities and powers of the several administrative officers in a public-school system. A copy of this pamphlet should be placed in the hands of every member of the general court, with urgent request for action which will make the recommendations law.—The Boston *Transcript*.

BOOKS AND LITERATURE

THE TEACHING OF ELEMENTARY MATHEMATICS

The industrial life of America has undergone revolutionary changes during the past twenty years. Efficiency is the watchword of modern business; for its realization critical examination is made of the details involved in the manufacture of any article of commerce. Standardization of materials and processes has been in thousands of large industrial enterprises a by-product of the movement to attain efficiency in production. The chemist and the physicist, engaged in research, even occasionally the mathematician, are found

upon the payroll of great industrial concerns; experimental laboratories are a common part of the equipment of large manufacturing plants. The test-tube and the blow-pipe are in constant use upon materials, while the stop-watch and the moving-picture machine are used upon the workers to make possible determinations of proper motions and methods to secure greater efficiency. In the executive offices the graphical examination of cost statistics and of other statistical data is not an uncommon procedure. The farmer, too, has been touched by the modern movement. The payment for milk by dairies is now made upon the basis of the Babcock test, while in the cow-barn a statistical record is commonly kept of the yield of each individual cow; even a cow must justify her existence by proving that she pays for her keep in milk produced. The movement for efficiency, essentially a part of the movement for the conservation of all resources, has led naturally to the critical examination of the details of production, many of which have long been retained in the business world, as in the school world, only because they are traditional.

In view of the great expenditures upon public education and in view of the magnitude of the educational enterprise upon which America is engaged no surprise need be occasioned by the fact that the industry, if we may so term it, should be subjected to the same critical scrutiny which other industries have received. The survey of the whole system of educational institutions operating in an entire state, such as the study of education in Vermont, and the numerous state surveys now being directed by the National Bureau of Education, and the surveys of city systems, of universities and normal schools, are the direct products of the corresponding movement in the business world. Our comprehension of the minute details of such studies, particularly of the changes in the curriculum of the schools, will be greatly aided if in the examination of the changes we keep in mind the large movements outside the school room which have effected so vitally that which goes on within the walls of the school room. School and society were never so closely related as they are to-day; formerly the schools were slow indeed to respond to the demands of society, but in the present tendencies of our schools we see reflected the forces still in operation upon the industrial world.

The instruction in mathematics has been in no wise kept aloof and apart from the work-a-day world. The critical examination of the study of mathematics has been made sometimes by experts, but much more frequently by those whose capacity to criticize may well be questioned. Too many of these critics, some of whom would even deny to mathematics a place in the high-school curriculum, forget that "the life is more than meat, and the body is more than raiment." Mathematics has been accorded a place in every ancient and modern system of education not because of its practical applications, but because as an intellectual being man has a real and vital interest in this phase of life. Any discussion and examination of the school curriculum should recognize the fact that we are spiritual and intellectual beings as well as physical and social. Surely, too, the great world tragedy now being enacted should suggest that ideal considerations and the higher law have a great claim upon educators.

Progress in the teaching of mathematics during the past ten or fifteen years has been made along several lines, notably in a greater amount of correlation between the various branches of mathematics and between mathematics and life. The historical development of mathematics, particularly as related to the history of civilization, is receiving more serious attention. The details, also, of the teaching of mathematics are being studied by eminent mathematicians, in a thorough manner that fifteen years ago would hardly have been thought compatible with the dignity of mathematicians of even minor note. Evidence of this movement is found in The International Commission for the Reform of the Teaching of Mathematics and in the formation of a new society, The Mathematical Association of America, which has the purpose of reaching in the higher institutions of learning the great body of teachers of mathematics whose interest is primarily in teaching rather than in research.

The demand for this latter organization is indicated by the fact that it has a membership of more than 1,200 individuals.

The actual correlation between the various branches of mathematics taught in the secondary schools has received considerable attention during the past ten years. Similarly in the college work a more intimate correlation of algebra, trigonometry, analytical geometry and also the calculus, occasionally, is attempted during the first two years of college mathematics. Correlation, too, of the arithmetic with the other subjects of the elementary curriculum is practised much more widely than formerly; the introduction in connection with the arithmetic in the seventh and eighth grades of the material or the methods, or both, of elementary algebra as well as some constructive geometry is now the rule in the larger and better schools rather than the exception. This change has been greatly facilitated by the somewhat widespread adoption of departmental instruction in these two grades; the special teachers of arithmetic are better trained in mathematics and are more competent to make these desirable innovations. In the secondary and in the college field the attempt is made, also, to correlate the mathematics more definitely with life, as well as with naturally related subjects such as physics, manual training and engineering.

Among the text-books in the high-school field which actually make the correlation between algebra and geometry, in particular, first place must be accorded to the texts emanating from the school of education of the University of Chicago. Originally the work was prepared by Professor George W. Myers and collaborators, but the work is now rewritten by Mr. E. R. Breslich, head of the department of mathematics in the Chicago University High School, under the editorship of Professor Myers. The series of books, entitled "First-year Mathematics" and "Second-year Mathematics," with a third volume in preparation, enjoys considerable popularity in the United States and somewhat extravagant claims are made as to the success of the work. The plan of the work has much to commend it; particularly, too, this type of work has been in use for many years in foreign schools where the teachers have, in general, that training in mathematics which is, although always desirable, more necessary in the use of a correlated text than with a straight text.

There is a certain arrogance of assumption on the part of the authors of some of such correlated texts—let me definitely exclude Professor Myers—that the method is something entirely new and original with these authors. There has been this correlation in European schools for more than one hundred years; royalties have not been as large in Europe, or the attraction for scholars less, so that good teachers have used these methods without putting all of the material in print. Further, more than one thousand years ago when the great Arabic mathematician, Mohammed ibn Musa al-Khowarizmi, wrote the first systematic treatise on algebra he included not only the well-known geometrical solutions of the quadratic, but also the application of the algebra to a geometrical problem. The problem is to insert a square in a given isosceles triangle, and it is fairly representative of the correlations which have been made over and over again from that day to this.

Several other correlated texts in high-school mathematics are now on the market, and others are announced as in active preparation. The Century Company issues a series entitled "Correlated Mathematics for Secondary Schools." This series includes to date an "Algebra, First Course" and a "Plane Geometry," both by Miss Edith Long, High School, Lincoln, Nebraska, and Professor W. C. Brenke, of the University of Nebraska. The texts are not very different from the straight texts in common use; in the geometry the arithmetical and algebraical application is insisted upon, but it must be said that this is now usually the case. In the two books on "Secondary School Mathematics" (D. C. Heath and Co.), Principal R. L. Short, of the West Technical High School, Cleveland, and former superintendent of schools at Cleveland, W. H. Elson, have actually brought some of the demonstrational geometry into the first year, and have unified the mathematics of the second year.

No mathematician will dispute the desirability of the more intimate association of arithmetic, algebra, geometry and trigonometry. The defects of the plan of a unified course of mathematics in the high schools are largely the reflection of the defects of our secondary system. Teachers with deficient preparation, frequently shifting from one school to another, are less able to adapt themselves to the situations arising in the unified work; a certain unity of the separate subjects is in danger of being replaced by a hodge-podge; difficulty is created for the migratory pupils, a relatively large body in our schools. In the larger high schools we may expect the gradual introduction of the new texts; this will mark no great break as the better trained teachers have for many years made the correlation. Now, particularly, with departmentalized seventh- and eighth-grade instruction, the instruction in elementary algebra and constructive geometry greatly facilitates the closer union of the mathematical disciplines in the high school.

Recently the trigonometrical ratios have been receiving recognition in the texts on plane geometry. Another desirable innovation is the introduction of problems and illustrations in applied design. The Ford and Ammerman "Plane and Solid Geometry" (Macmillan Co.), the Palmer and Taylor "Plane Geometry" (Scott, Foresman and Co.) and the Young and Schwarz "Plane Geometry" (Henry Holt and Co.) have these good points in common, as well as the common feature of collaboration of university and high-school men in the authorship. The Macmillan text is distinguished by exceptionally fine illustrations for the solid geometry; the Scott-Foresman text emphasizes the practical applications; the Henry Holt text stresses the "logical structure" of geometry, the use of symmetry, and introduces two-color printing in the figures. The attractive Betz and Webb "Plane Geometry" (Ginn and Co.) presents a somewhat longer and more varied preliminary course (68 pages) before embarking upon the actual demonstrational geometry; the authors are high-school teachers of unusual ability. The four texts mentioned are in series under the general editorship of university men; E. R. Hedrick, of Missouri, G. W. Myers, of Chicago, E. J. Townsend, of Illinois, and Percey F. Smith, of Yale, respectively, are the editors in question. The desirability of the active association of university men in the authorship of elementary texts is well illustrated by the entirely unscientific treatment of the subject of parallels in the Stone-Millis "Plane Geometry" (Benj. H. Sanborn and Co.), wherein theorem and axiom appear to be hopelessly mixed, and postulate is not so much as mentioned. In other respects this text involves the good points which characterize the preceding texts. The Wells and Hart "Plane and Solid Geometry" (D. C. Heath and Co.) and the Wentworth and Smith "Plane and Solid Geometry" (Ginn and Co.) are the worthy successors of the old and well-known Wells and Wentworth series, which held the field for so many years; the revisions are entirely in harmony with the best practises of the present day, maintaining the prestige of these series. The "New Plane Geometry" (American Book Co.), by E. R. Robbins, formerly of the Lawrenceville School, corresponds rather more closely than any of the preceding to the geometries in use ten years ago, due to its emphasis upon the demonstrational side; however, the demonstrations are simplified and the course is abbreviated in accord with the tendencies of the present day. Historical references and a wealth of simple originals, often with industrial applications, represent other lines of progress in the teaching, as in the texts, of present-day geometry.

Elementary algebra has undergone minor changes as compared with those which we have indicated as characteristic of the geometry. The tendency to introduce practical material is also to be observed. The early introduction of the graph and the wider use of graphical methods is a marked innovation and improvement. The "School Algebra," in two books (Henry Holt and Co.), by Rietz, Crathorne and Taylor embodies attractively the new ideas. The same may be said of the "First Course in Algebra" and the "Second Course" (D. C. Heath and Co.), by W. B. Fite, of Columbia University. The "Grammar School

Algebra" (Ginn and Co.), by D. E. Smith, of Teachers College, Columbia University, is evidently designed for seventh and eighth grades where the content of the arithmetic has been reduced to make way for the algebra and geometry. "A Review of Algebra" (American Book Co.), by R. H. Rivenburg, will be a serviceable addition to the library of the teacher of algebra, presenting general review problems and a series of typical college entrance papers; the latter do not reflect markedly the improvements and innovations of the present day, undoubtedly due to the fact that these papers must be adapted to the preparation of pupils who come from many sections of the country.

Advanced arithmetic of a theoretical character formerly had a place in many high schools; this work is rapidly being displaced by various types of vocational mathematics, involving algebra and geometry as well as arithmetic. Dooley's "Vocational Mathematics" (D. C. Heath and Co.) is designed to give training in the arithmetical computations which arise in the various trades. The material, particularly that concerned with electricity and with machinery, is highly useful and informational, in the broadest sense, as well as excellent arithmetically; a somewhat similar work for girls is in preparation. This type of "advanced arithmetic" needs no apology.

Along the same lines, but not as complete nor as well arranged, is the "Industrial Arithmetic" (P. Blakiston's Son and Co.), by N. L. Roray; this work is arranged in the form of 79 lessons (154 pages) and includes many problems of the older, drill type. The introduction, compulsory now in many states, of the study of agriculture has stimulated the movement to apply the mathematics to real farm problems. For the elementary schools the "Farm-Business Arithmetic" (D. C. Heath and Co.), by Lewis, and the "Agricultural Arithmetic" (Macmillan Co.), by Stratton and Remick, will prove veritable mines of information for all teachers of arithmetic who desire to present problems which give correct information concerning farm life. These works might well be used, too, in secondary schools in combination with the above mentioned industrial arithmetics.

In commercial high schools the advanced work in arithmetic has, naturally, taken another direction, along the line of commercial transactions. On the whole this arithmetic of commerce does not yet appear to have been as successfully treated in any text-books as the industrial and agricultural arithmetic. Undoubtedly the explanation for this fact is that the corresponding material in the elementary arithmetics has been so well given in the latest texts, and so completely, that there is little left for the high school. The "Modern Business Arithmetic" (Henry Holt and Co.), by Finney and Brown, will be found to give correct ideas concerning modern business; so also, in lesser measure, the "Secondary Arithmetic" (Benj. H. Sanborn and Co.), by Stone and Millis, which is not so exclusively devoted to business.

A text which might well be used to supplement straight courses in algebra, geometry and trigonometry is the "Elements of Applied Mathematics," by Professor H. E. Cobb, of Lewis Institute, Chicago. A number of problems are presented for graphical solution illustrating the wider use of graphical methods in the business world. The application of mathematics to practical problems emphasizes in a natural and forceful way the essential unity of the arithmetic, algebra, geometry and trigonometry; the real situation demands mathematics without fine distinctions of subdivisions.

The two related movements towards unified and applied mathematics which we have noted as influencing the instruction in secondary mathematics have also had a marked effect upon the first- and second-year work in college mathematics. The mathematics of statistics and of investments is playing a larger rôle in the colleges. The University of Michigan has an active statistical laboratory; and the same is true of the University of Edinburgh, as well as of many other universities. Parenthetically we may remark that the movements which we have discussed have been equally potent in England and on the continent. In England, particularly, Euclid long held sway to the

absolute exclusion of any modern developments; however, in the past ten or fifteen years the so-called Perry movement has revolutionized the mathematics in hundreds of English schools; texts on applied, practical or shop mathematics are even more common in England than in the United States.

The pioneer text on unified mathematics for colleges is the work, "A Course in Mathematics for Students of Engineering and Applied Mathematics" (Ginn and Co., 1907), in two volumes, by Woods and Bailey, of the Massachusetts Institute of Technology. In spite of many merits the books have had no wide adoption, possibly because the course is a little beyond the ability of the ordinary student in schools where the requirements are not as rigid as in the Boston institution. The "Analytic Geometry and Principles of Algebra" (Macmillan Co.), by Ziwet and Hopkins, of the University of Michigan, gives a first course combining very well the algebra and analytics. A number of other texts are under preparation by writers in different parts of the country, including usually the trigonometry and occasionally some work in calculus.

The excellent "College Algebra" (D. C. Heath and Co.), by W. B. Fite, and the neat "Analytic Geometry" (D. C. Heath and Co.), by W. A. Wilson and J. S. Tracey, of Yale University, are fairly representative of the many excellent straight texts on these subjects which are now in use. Emphasis is placed upon the preparation for the calculus, as well as upon such phases of these subjects as lend themselves to physical problems.

Arithmetic has been regarded for many years as the one fundamentally practical subject of the elementary schools. Even to-day, however, a critical examination of the problems which appear in the arithmetics enjoying the widest circulation will reveal the fact that while on the surface the problems are applied, the larger percentage of the problems are highly impractical, corresponding in no wise to the situations which obtain in actual life. No better illustration, possibly, can be found than this, that a text on arithmetic which is still widely used, whose title proclaims that it is a product of the twentieth century, consists in large measure of the problems which appeared in the original edition of the work that was published soon after the Civil War; even the obsolete business practises of that day, such as "days of grace" and "inspection fee" for fire insurance policies, are retained. Many of the farm problems in modern texts have a distinctly city air; the business problems are too frequently romance, pure and simple.

A happier day is dawning, fortunately, for the pupil long oppressed by fanciful, complicated problems. The newer texts are cutting out obsolete topics, and giving simpler, more tangible problems. The "Everyday Arithmetic" (Houghton Mifflin Co.), by Hoyt and Peet, is representative in title, and largely in content, of the best arithmetics of the present day. The recent "Essentials of Arithmetic" (Ginn and Co.), by Wentworth and Smith, and the "Silver-Burdett Arithmetics," by Philips and Anderson, eliminate, simplify and vitalize the arithmetic in accord with the best modern practises. No text can be written that will serve without change for all sections of the United States, but a good text will stimulate the teacher to attempt definitely to adapt the instruction in arithmetic to the child and to the community in which the child lives.

Among the advances which have been recorded in instruction in this subject in the past ten or fifteen years may be mentioned, particularly, the elimination of square root and cube root, the elimination of the tables of elevens and twelves which serve no purpose, and the elimination of alligation, highly specialized tables of measures, partnership, true (false) discount, annual interest, and partial payments. In general topics are eliminated which do not contribute to the comprehension of the larger numerical phases of the world of to-day. The unreal fractions of the older texts are being replaced by such fractions as are in daily use in the world of affairs; in integers, too, the tendency is to restrict the operations largely to the three and four place numbers with which most of us must be content.

The purely mechanical side of arithmetic is made the subject of serious study in the tests which have been devised by S. A. Courtis,

director of research in the Detroit public schools. The use of these time tests gives to the teacher very definite information concerning the ability of a child to add, subtract, multiply and divide. Individual weaknesses can be located and each child can be given just that type of mechanical drill which he needs, instead of giving to all children precisely the same drill day after day. As the tests have been given to many thousands of children it is possible to set up standards of achievement in these abilities for the grades from the fourth to the eighth; in this way not only can the individuals of a school be compared with each other, but the relative standing of different schools can be determined and the progress of a school and of individuals can be determined. The extended use of these tests has been probably the most potent single factor to improve the teaching of arithmetic that has been operative within a decade; their general use in our schools is greatly to be desired.

Instruction in arithmetic includes, it should be noted, much more than training in the abilities to add, subtract, multiply and divide. The informational side of the work is not to be despised, and the reasoning part is all-important, particularly in the sixth to the eighth grades. A tendency to measure that which is not measurable, to misapply mathematics, is unfortunately common; this makes it desirable to reemphasize that in arithmetic as in many other subjects the purely mechanical is only one of many phases of the work.

The history of mathematics is receiving in our schools and in our texts more adequate recognition. The general history of science is likewise being accorded a place in the training of scientists as well as a place in the elementary texts for the schools. Historians, too, are giving to the history of science as a part of the history of civilization more serious study. At least two general texts in this field are in course of preparation.

The publications by David Eugene Smith along the lines of the history of mathematics constitute the most notable American contributions of the decade past. The "Rara Arithmetica" (Ginn and Co., 1908), a descriptive catalogue of the wonderful library of Mr. George A. Plimpton, is a storehouse of information on the early history of arithmetic. "A History of Japanese Mathematics" (Open Court Publishing Company, 1914), by Smith and Mikami, presents this story most attractively. "The Hindu-Arabic Numerals" (Ginn and Co., 1911), jointly by Professor Smith and the writer of this review, considers the development of the numerals which we use, from their origin in India to their adoption by the Arabs and their dissemination through Europe. Augustus De Morgan's "A Budget of Paradoxes" (Open Court Publishing Co.), in the handsome new edition, with notes by Professor Smith, offers to teachers of elementary mathematics a wealth of interesting material, by the two men who have done the most in recent times to popularize the study of mathematics. The publication by R. C. Archibald of "Euclid's Book on Divisions of Figures" (Cambridge University Press) constitutes a worthy continuation of the studies in Greek mathematics which have been made by Sir Thomas L. Heath; no greater tribute to the work could be paid than this, for Sir Thomas Heath has made available in English, with critical and illuminating commentary, the greatest works of Greek mathematicians, and has contributed largely to a wide appreciation of Greek mathematics. F. Cajori has made a number of interesting studies, of which the life of William Oughtred (Open Court Publishing Co.) is of particular interest to teachers of elementary mathematics. Professor G. A. Miller's "Historical Introduction to Mathematical Literature" (Macmillan Co.) is also worthy of mention among the recent works touching the field of the history of mathematics. Possibly the writer will be pardoned for mentioning a work of his own pen: "Robert of Chester's Latin Translation of the Algebra of Al-Khowarizmi, with an introduction, critical notes and an English version" (University of Michigan Studies, Humanistic Series, Vol. XI., Part I.). The text is the first systematic treatise on algebra, whose title has given us the term "algebra," a work written about 825 A.D. by the Arabic mathematician, Abu Abdallah Mohammed ibn Musa al-Khowarizmi. The

introduction attempts to give briefly the development of arithmetical and algebraical science from earliest times up to the fifteenth century; the work is designed to be of value to the teacher of algebra.

"The Teaching of Elementary Mathematics" (The Macmillan Co.) is the title of a work published sixteen years ago by David Eugene Smith, which work marks, in a way, the opening of a new era in mathematical instruction. The appeal to common sense instead of blind tradition, the attention to suggestive foreign texts, writers and customs, and the study of the historical development of the elementary mathematics are characteristic of this work; these points are characteristic of the instruction of the present day.

"The Teaching of Mathematics in the Elementary and the Secondary School" (Longmans, Green and Co.), by J. W. A. Young, of Chicago University, is an excellent work which has had a wide circulation. Professor Young has edited also a series of monographs on interesting phases of secondary mathematics, "Monographs on Topics of Modern Mathematics" (Longmans, Green and Co.); every teacher of mathematics should be familiar with the content. J. W. Young, of Dartmouth College, has illuminated a rather difficult field in his "Lectures on Fundamental Concepts of Algebra and Geometry."

A high-school teacher in active service, Mr. G. W. Evans, approaches the subject of the teaching of high-school mathematics from a slightly different angle from the college professor; his "Teaching of High School Mathematics" (Houghton Mifflin Co.) will be found of real value. So also Arthur Schultze's "The Teaching of Mathematics in Secondary Schools" (Macmillan Co.) shows the detailed and minute treatment of points of actual difficulty discovered by the class-room teacher. The English standpoint with reference to the elementary mathematics is presented in an interesting manner by G. St. L. Carson's "Essays on Mathematical Education" (Ginn and Co.); particularly applicable to American needs is his discussion of "the useful and the real."

Books on the teaching of arithmetic have appeared with considerable regularity in the United States for a period of about fifty years; sometimes the nature of the work has been disguised by the use of the words "philosophy" or "psychology," terms affecting only the titles. Of late the field of arithmetic has been the favorite stamping ground of pedagogical experts and others whose primary interest is not in arithmetic nor in mathematics; the fact, surprising to some, must be noted that in certain of these instances real contributions have been made.

The first of the distinctly modern discussions is an article, "The Teaching of Arithmetic," in the *Teachers College Record* for January, 1909, by David Eugene Smith; later this was expanded into a book with the same title, published by Ginn and Co. The subject of standardization had not received at the time this article was written the attention which it deserves. Mr. S. A. Courtis has published a "Manual of Instructions for giving and scoring the Courtis Standard Tests" which gives full information concerning his tests. Later works on the teaching of arithmetic include, in general, discussions of the Courtis and other time tests. "A Text-book on the Teaching of Arithmetic" (American Book Co.), by A. W. Stamper, of the State Normal School at Chico, California, will appeal to many teachers, as it presents numerous devices for use in the school room. "How to Teach Arithmetic" (Row, Peterson and Co.), by J. C. Brown and L. D. Coffman, emphasizes rightly the scientific time studies which have recently been made, as well as giving many details applicable in the grade work. The "Practical Methods in Arithmetic" (D. C. Heath and Co.), by J. H. Walsh, confines itself to devices and suggestions having reference to the presentation of arithmetic in the classroom; the work is inferior to the other texts along this line which we have mentioned.

"The Supervision of Arithmetic" (Macmillan Co.), by W. A. Jessup and L. D. Coffman, is the most recent and in certain vital points the most important work on instruction in arithmetic which has appeared. The great value of the study is that it presents the consensus of opinion of hundreds of school super-

intendents, with reference to matters of dispute in the teaching of arithmetic. The united judgment of a great body of school superintendents on debated points of the elementary-school curriculum should be of great weight and of real value; the investigation of the courses of study in hundreds of cities reflects not only the judgment of many superintendents, past and present, but also reflects the opinions and judgments of the many able teachers of arithmetic who have from time to time assisted in revising these courses of study. This combined judgment is, fortunately for my presentation, entirely in harmony with the movements and tendencies which I have indicated above as characteristic of the present trend in mathematics.

The twelve chapters of the book treat the subject-matter of arithmetic, the grade distribution of different topics, the time allotment for arithmetic, the methods (spiral, topical, Austrian in subtraction, etc.), sequence of multiplication tables, oral work, drill, grade for introduction of text, judging text-books, algebra and geometry in grades, problems related to business life, and tests and results as shown by special investigation. Some information concerning the use of the tables of elevens and twelves, which is even to-day unfortunately common, would have been desirable. As the age of entrance into the public schools varies in different communities some variations in procedure which are found are explainable upon this score; the exact information would have been desirable. Special teachers of arithmetic in the seventh and eighth grades are found in many schools; as this is a matter of current interest, its omission is to be regretted. Not only superintendents of schools, but also all teachers of arithmetic will find that this book will well repay very careful study.

Great improvement in the teaching of mathematics has come within the period covered, perforce inadequately, by this review. The serious attention which has been given to a critical examination of the methods now in use, the comparative study of foreign systems of teaching mathematics, the study of the historical development of the subject, the dissemination of fruitful ideas through many new text-books, and the increased attainments of the teachers of mathematics are prominent factors in the notable advance.

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THE NEW HAMPSHIRE BUREAU OF EDUCATIONAL RESEARCH[1]

The Bureau of Research was made possible by an appropriation of $5,500 annually awarded by the General Education Board for this purpose. The appropriation was placed in the hands of the superintendent of public instruction for administration and the arrangement was sanctioned by the governor and council. The bureau has no official connection with the state government other than the above. A subsequent appropriation of $1,000 annually for publication was made by the board at its October meeting, 1916.

The bureau was organized by the transfer of Mr. H. A. Brown, at that time deputy state superintendent, to the duties of director of research work. Work began December 1, 1915. Mr. Brown worked alone on material which had accumulated in the department until February 1, when a stenographer was added. A permanent assistant was employed July 1, and two additional assistants were employed during the summer vacation. The work of the assistants is wholly in the scoring of papers and the assembling of data under the oversight of the director.

PURPOSE OF THE BUREAU

Bureaus of research in education are a new departure, and, so far as is known to the writer, this is the first to be attached to a state education office. Several of the great cities have them.

In a word, it represents an attempt to secure the facts regarding educational processes of various kinds by scientific methods, to study them, to demonstrate what is best and most efficient and most economical, and to found methods of teaching upon the conclusions thus

[1] Advance sheets from Report of State Superintendent H. C. Morrison.

reached. On the other hand, and quite as important, it endeavors to find out what and how much of the educational process as it exists in the schools is useless and wasteful.

A large part of its work is found in the devising and testing of reliable scales for the use of superintendents of schools and teachers who wish to approach their problems in an impartial and scientific spirit, to determine the facts and follow the leading of the facts.

The citizen will recognize at once the application to education of methods found valuable in industrial enterprises in the modern world. The efficient and successful manufacturer has long maintained a staff of scientists to investigate his processes, to discover ways and means of greater economy and efficiency, and to formulate methods in accordance with such discoveries. The lessons taught by the European war have, as is well known, made it evident that scientific management of all enterprises must replace traditional and rule-of-thumb methods, and there is foreshadowed an enormous development of institutions for research work in all directions.

The processes of education are peculiarly in need of such methods of administration. The content of education is traditional. Courses appear in the program for no better reason than that they have always appeared there. On the other hand, as an offset to the traditionalism of conservatives, we have seen much of the introduction of material in the program which represents only the fads of radicals impatient for change for the sake of change. The fitting remedy for both classes of evils is the demonstration of social needs to be met by the school, the formulation of courses demonstrably capable of meeting the needs, and the development of methods demonstrably efficient in making the courses effective.

On the other hand, in the field of methods, our school systems in this and in other states are full of devices which bear much the same relation to serious and scientific teaching as do patent cures to the legitimate practise of medicine. The reason is obvious. A teacher of fertile mind but with meager capacity in psychological analysis devises a "scheme" for teaching reading, or writing, or arithmetic or what not. She succeeds in immediate classroom results. Some publishing house is attracted and a "new method" bearing the teacher's name is foisted upon a trusting and eager school public with all the push of modern merchandising behind it. Some of these methods are good, many positively bad, and most indifferent and harmless. The characteristics of most of them are that they work the teachers to nervous breakdowns, produce spectacular results in the classroom, and do not transfer to the ordinary experience of the pupil. Such devices would never have attained their present vogue if each had in the beginning been called upon to justify its claims in terms of its permanent effects on pupils. An immense amount of time, of money and of energy will be saved and more effective teaching will be done when these several "methods" have been investigated, their effects measured, and the results disclosed.

THE WORK OF THE BUREAU

The bureau has barely completed a year's work at the time of writing. There is here presented a summary.

I. Nearly 4,000 papers measuring pupils' ability to read, gathered in different school systems of the state, from Grade III. to and including the senior classes in the normal schools, were scored, the data assembled and analyzed, and the results published. This study, constituting Bulletin No. I., was immediately in very great demand from all parts of this country and from foreign countries. The first edition of 500 copies was quickly exhausted and a second edition of 2,500 copies published.

Though intended only as a preliminary study, certain results were established.

1. First of all, an adequate method of measuring ability to read in terms of the pupil's capacity to get thought from the printed page was established for the use of superintendents. With this method they can from time to time measure the capacity of different rooms and children and know what progress is actually being made.

2. Unsuspected differences in actual read-

ing ability within the same class were revealed which can fairly be characterized as enormous, so great in fact as to render any attempt at productive instruction of all grades of ability worse than futile.

3. It was found that schools and school systems of substantial equality in results differ very greatly in the amount of time and energy given to reading. For instance, one system which has excellent teaching of one of the "patent methods" spends more than five times as much time in getting a given result as do several systems with simple methods in getting the same result.

4. It was demonstrated that pupils are frequently found in the third and fourth grades who have as high reading capacity as the average of the eighth or as many pupils in the high school. A means is afforded of identifying these pupils and excusing them from further formal instruction, thus releasing them for studies in which they are less proficient and the teacher for pupils who are more backward.

5. It is strongly suggested by the study that ability to read bears a close relation to ability to study; that failures of pupils in higher classes is often due to their inability to grasp the thought of the writer from the printed page on which that thought is set forth; and that reading ability may probably be developed as a function of study ability, that is to say, that properly directed and supervised study will result in enhanced reading ability.

II. The beginnings were made of a study of the actual social needs of arithmetic content. This study aims to discover and classify the processes actually needed in the common life of the day. The method involves interviews with 1,000 citizens or more ultimately. It will be a slow and laborious process. The blanks have been prepared and work is going slowly on in the hands of collaborators.

This study will be followed, it is hoped, with a series of studies dealing with the special arithmetical needs, if any, of the several vocations.

III. An extensive study has been made, and is ready for publication, dealing with the capacity of pupils to read thought from the Latin page after studying Latin from one to four years in the high school.

The method used is substantially the same as in the case of reading. Twenty-nine high schools were measured and 812 pupils. A mass of valuable information was gathered and the following conclusions seem to be justified:

1. The schools tested as measured by the Latin capacity of their graduates in college compare favorably with those of other states.

2. There is but little improvement in capacity to read the meaning of ordinary Latin prose after the second year.

3. The ability attained at the end of the fourth year is meager out of all proportion to the time, energy and money devoted to Latin study and teaching.

4. Of the three methods in use, the direct, the translation and the grammatical, the translation method is slightly the most effective and the direct decidedly the least effective. In time used the translation method is decidedly the most economical.

5. As to attainment of grammatical sense, that is ability to react correctly to a grammatical construction as distinguished from ability to tell what it is, pupils who have had little or no formal instruction in Latin grammar on the whole do better than those who have had much instruction—and that the best instruction of the kind we have been able to find in the state.

6. It is clearly evident that Latin instruction instead of being a help to the clear, forcible, elegant, or accurate use of English is either of no effect or a positive harm. This latter point, whether of no effect or a positive harm, we hope to clear up in a future study.

IV. A study for French similar to that for Latin has been made. The results have not yet been published.

V. A study of results in stenography has been made, designed chiefly to discover the relative merits in respect to efficiency and economy between the direct method of teaching, in which pupils take notes which in themselves have a meaning from the first, and the formal method in which pupils first spend many months of drill on meaningless symbols

before taking dictation of connected discourse. This study has not yet been published.

PROJECTED WORK

I. A much more extensive study of reading. This will involve a comparison of results found in the preliminary study, which was primarily for the purpose of furnishing diagnostic guidance to superintendents, with results obtained in a field study made one year later upon 10,000 pupils. The data have been collected and are in process of reduction.

Further studies are planned in which the test material used will be expository in type instead of the simple narrative used in the present studies. The purpose here is to ascertain what, if any, planes and types of reading ability develop as the pupil grows older.

II. A study of transfer in spelling is projected similar to that of O'Shea but based upon tests given to several thousand children, in school systems first tested for technique in spelling instruction. Several recent studies in this and other subjects have, we think, been inconclusive because they have failed to account for the effects of differences in technique of instruction.

III. A study of the various systems of handwriting in the state designed to reveal differences in efficiency and economy, measured in terms of the pupils' writing when not under control. The scales of Ayres and of Freeman will be used.

IV. The development of a workable scale in English composition. The scale has already been projected.

V. The use of the scale for the purpose of developing a series of norms for quality of composition from Grade IV. through Grade XII.

EDUCATIONAL RESEARCH AND STATISTICS

WHO'S WHO ON OUR BOARDS OF EDUCATION

THE assertion has been made that the members of boards of education in American cities are picked largely from the business and professional classes. The facts, collected in December, 1916, directly from the superintendents of more than a hundred of the leading cities of the United States, bear out the assertion to a surprising degree.

The study was begun by writing a letter to the superintendent of schools in each of the 131 cities which reported a population of more than 40,000 in 1910. Replies were received from 104 cities.

The replies cover most of the large cities. Thus complete data were obtained from seven of the eight cities with a population of 500,000 or over; 33 of the 42 cities with a population of 100,000 but under 500,000; and 64 of the 81 cities with a population of 40,000 but under 100,000. The total population of the 104 cities from which complete data were received was slightly under 24 millions, or about 26 per cent. of the population of the United States, at the time of the last census.

The boards of education in the largest American cities are for the most part "small" boards. Less than a fifth of them report more than ten members.

TABLE I

Boards of Education in Certain American Cities Classified According to Size

Number of Board Members	Number of Boards
5 or less	26
6 to 10	59
11 to 15	13
16 and over	6
Total	104

The larger cities report the largest boards. The six boards with sixteen or more members were evenly divided—2 in each group of cities. One city with 500,000 or more population reports a board of 5 or less and one a board of 6 to 10. Twelve cities with 100,000 but less than 500,000 population report a board of 5 or less and 15 report boards of 6 to 10. Thirteen cities with 40,000 but less than 100,000 population report boards of 5 or less and 43 report boards of 6 to 10. The bulk of the small boards are therefore found in the smaller cities.

The vast majority of board members are men. Only seven in each hundred of the total number of board members in the 104 cities were women and the per cent. of board members who were women decreases steadily from

12 per cent. in the larger cities to 5 per cent. in the smaller cities.

TABLE II

Members of Boards of Education Classified by Sex and by City Size in Certain Cities

Cities with Population of	Per Cent. Who Were		Total Board Members
	Men	Women	
Over 500,000	88	12	112
100,000 but under 500,000	92	8	266
40,000 but under 100,000	95	5	589
All cities	93	7	967

The real interest of the study centers in the occupations of the various board members. The occupations were divided into three main groups—"business," "professional" and "miscellaneous." Under "business" are included merchants, manufacturers, capitalists, contractors, real estate and insurance men, officials in railroads, banks and other corporations. Under "professional" are included doctors, lawyers, teachers, ministers, authors, editors, scientists, social workers and artists. The "miscellaneous" group was made to include retired business men, homekeepers, clerks and salesmen, foremen, mechanics and miscellaneous occupations. The great majority of board members are either business or professional men.

TABLE III

Occupations of Members of Boards of Education Classified by City Size

Cities with Population of	Occupations		Miscellaneous	Total
	Business	Professional		
Over 500,000	43	46	24	113
100,000 but under 500,000	128	100	38	266
40,000 but under 100,000	262	187	139	588
All cities	433	333	201	967

These general totals show that more than three fourths of all the board members of the 104 cities reporting were business or professional men. The business men constitute the largest single group, comprising more than half of the total number of board members, while the miscellaneous group contains slightly more than one fifth of the total number of members. The tabulation shows a concentration of occupations of board members in a relatively small number of pursuits. Thus 144 of the business men were merchants, 78 were manufacturers, and 104 were bankers, brokers, real estate and insurance men. The concentration is still greater in the case of the professions. Of the 333 professional men 118 or more than one third were doctors and dentists, 144 or about two fifths were lawyers. The total number of teachers was 18. These were for the most part college professors.

The miscellaneous pursuits, while relatively unimportant, are peculiarly significant. Twenty-seven retired business men are in this class. The class also includes 48 clerks and salesmen, 39 mechanics and wage earners and 25 foremen. In the ordinary American industrial city the wage earners and clerks comprise approximately five sixths of the total number of gainfully occupied persons. Of all the members of the boards of education included in this study four in each hundred are mechanics and five in each hundred are clerks and salesmen. Thus more than nine tenths of the board members in the cities under consideration fall outside of the class which makes up five sixths of the population—or to put the matter somewhat differently, nine tenths of the school board members of the large American cities are selected from one sixth of the gainfully occupied population, which is above the rank of wage earner or clerk.

Five occupational groups include the bulk of board members—merchants, manufacturers, bankers, brokers and real estate men, doctors and lawyers—588 out of a total of 967 board members. Thus more than three fifths of the total number of members are engaged in five groups of business or professional occupations.

American school-board members are primarily business and professional men. A very few women occupy positions on the school boards, and a comparatively small number of men from the subordinate industrial positions —wage earners, clerks, foremen—are found among the board members. This type of board member is in the decided minority. The vast majority represent directly the business and professional interests of the community.

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